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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/755,602	01/12/2004	Qi Xiang	039153-0693 (H1718)	9549
34083	7590	04/06/2006	EXAMINER	
AMD-MKE C/O FOLEY LARDNER 777 EAST WISCONSIN AVENUE MILWAUKEE, WI 53202-5367			CHEN, JACK S J	
			ART UNIT	PAPER NUMBER
			2813	

DATE MAILED: 04/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/755,602

Applicant(s)

XIANG ET AL.

Examiner

Jack Chen

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 and 21-24 is/are pending in the application.
- 4a) Of the above claim(s) 3, 5 and 11 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4, 6-10, 12-16 and 21-24 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 January 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 11/3/05.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

1. Applicant's election of the invention of Group I, Species I in the reply filed on October 20, 2005 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).
2. Claims 3, 5, 11 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Species, there being no allowable generic or linking claim.

Information Disclosure Statement

3. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Drawings

4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the liner must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing

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sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 13-15 and 24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Re claim 13, the phrase "low temperature" is unclear and indefinite (with reference to what?).

Re claim 14, the phrase "below 750 oC" is unclear (what's the lower limit?).

The remaining claim 15 is rejected for depending from the above rejected claims.

Re claim 24, the phrase "the trenches" lacks antecedent basis.

For the purpose of patentability, these claims will be interpreted as best understood.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1-2, 4, 6-10, 12-13, 16 and 21-24 are rejected under 35 U.S.C. 102(e) as being anticipated by Ohnishi et al., U.S./6,878,606 B2.

Re claim 1, Ohnishi discloses a method of manufacturing an integrated circuit having trench isolation regions in a substrate including a first layer, the method comprising: selectively etching the first layer 313 (fig. 30 or 36) or 12 (fig. 1) to form apertures associated with locations of the trench isolation regions; forming strained semiconductor material 81/331 (fig. 32) or 381 (fig. 37) or 13 (fig. 3) above the first layer; and forming insulative material 341 (fig. 33) or 16 (fig. 8) in the apertures to form the trench isolation regions, see figs. 1-40 and cols. 1-16 for more details.

Re claim 2, wherein the strained semiconductor material 13 (fig. 3) or 331 (fig. 32) or 381 (fig. 37) is formed on sidewalls of the apertures.

Re claim 4, wherein the strained semiconductor material is formed before the insulative material is formed (figs. 3-4 or 32-33).

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Re claim 6, further comprising: siliciding the strained semiconductor material (col. 7, lines 45-50).

Re claim 7, wherein the strained semiconductor material is silicon (i.e., col. 5, lines 1-6) and the first layer is silicon-germanium (i.e., col. 5, lines 1-6).

Re claim 8, wherein the first layer is above a BOX layer 312 (figs. 30 or 37).

Re claim 9, Ohnishi discloses a method of forming shallow trench isolation structures in a compound semiconductor layer above a buried oxide (BOX) layer, the method comprising: providing a hard mask layer 21 (fig. 2) or 83 (fig. 3) above the compound semiconductor layer 313 (fig. 30) or 12 (fig. 2); removing the hard mask layer at locations (figs. 2 or 31); forming trenches in the compound semiconductor layer under the locations (figs. 2 or 31); stripping the hard mask layer (figs. 3 or 35); forming a strained semiconductor layer 81/331 (fig. 32) or 13 (fig. 3) above the compound semiconductor layer; and providing isolation material 16 (fig. 4) or 341 (fig. 33) in the trenches to form the shallow trench isolation structures, see figs. 1-40 and cols. 1-16 for more details.

Re claim 10, further comprising providing a silicide layer above the strained semiconductor layer (col. 7, lines 45-50).

Re claim 12, wherein the isolation material is provided by deposition (col. 5, lines 30-35 or col. 11, lines 23-30).

Re claim 13, further comprising providing a liner 14 (fig. 3; col. 5, lines 14-19) or 332 (fig. 32; col. 11, lines 5-10) in the trenches at low temperature [the oxidation (inherently shows the oxidation is carried out in an oxygen-containing atmosphere) method is considered as low temperature].

Re claim 16, wherein the trenches have a bottom reaching the BOX layer 312 (fig. 32).

Re claim 21, a method for producing an integrated circuit, which comprises providing a buried oxide (BOX) layer 312 (fig. 30); providing a compound semiconductor layer 313 (fig. 30) above the BOX layer; providing a strained semiconductor layer 331/81 (fig. 32) above the compound semiconductor layer and providing isolation trenches disposed in the compound semiconductor layer (fig. 33), wherein the isolation trenches include insulative material 341 and sidewalls, the sidewalls of the isolation trenches are at least partially covered by the strained semiconductor layer 331 (fig. 34), see figs. 1-40 and cols. 1-16 for more details.

Re claim 22, further comprising providing a gate structure 63 (fig. 35, also see fig. 8) between the isolation trenches.

Re claim 23, further comprising siliciding the strained semiconductor layer at a location of a source and a drain 65 (col. 7, lines 45-50).

Re claim 24, wherein the strain semiconductor material is silicon (col. 11, lines 1-5) and the compound semiconductor material is silicon-germanium (col. 10, lines 60-65) and the trenches extend from the strained semiconductor material at a top to the buried oxide layer at a bottom (fig. 31).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohnishi et al., U.S./6,878,606 B2 in view of Ngo et al., US Pub. No. 2004/0137742 A1.

Ohnishi disclosed above; however, Ohnishi is silent to forming the liner at a temperature of lower than 750 oC.

Ngo et al. teaches a method for forming semiconductor device, which includes forming the liner 38 (fig. 7) at a temperature of lower than 750 oC, see paragraph 51-58 for more details.

Therefore, the subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to use the temperature lower than 750 oC for forming liner as taught by Ngo et al. in the method of Ohnishi et al. in order to reduce germanium outdiffusion.

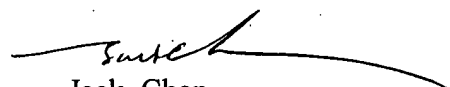
Furthermore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Ohnishi et al. by selecting the suitable temperature range for forming liner, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jack Chen whose telephone number is (571)272-1689. The examiner can normally be reached on Monday-Friday (9:00am-6:30pm) alternate Monday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W. Whitehead can be reached on (571)272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Jack Chen
Primary Examiner
Art Unit 2813

April 2, 2006